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IS 2360 (1977): Jerseys, Y-Neck, Plain-Knitted, Worsted
[TXD 10: Hosiery]



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“Knowledge is such a treasure which cannot be stolen”

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IS : 2360 - 1977
(Reaffirmed 1993)

Indian Standard
SPECIFICATION FOR
JERSEYS, Y-NECK, PLAIN-KNITTED, WORSTED
(Second Revision)

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Indian Standard

SPECIFICATION FOR JERSEYS, Y-NECK, PLAIN-KNITTED, WORSTED (*Second Revision*)

Hosiery Sectional Committee, TDC 15

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(*Continued on page 2*)

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IS : 2360 - 1977

(*Continued from page 1*)

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Indian Standard
 SPECIFICATION FOR
 JERSEYS, Y-NECK, PLAIN-KNITTED, WORSTED
 (*Second Revision*)

0. FOREWORD

0.1 This Indian Standard (Second Revision) was adopted by the Indian Standards Institution on 15 June 1977, after the draft finalized by the Hosiery Sectional Committee had been approved by the Textile Division Council.

0.2 This standard originally published in 1963 was first revised in 1970. It has been now revised to modify the micron values of wool used for spinning the knitting yarn and to provide for (a) the tolerance on the mass of individual jersey, and (b) seams at the shoulders for such jerseys which are not having side seams. The requirement in respect of the lower limit of the alkali solubility has also been included.

0.3 This standard is based on IND/TC/1534 (b) ' Jersey, pullover, woollen ' issued by the Ministry of Defence, Government of India.

0.4 This standard contains clauses 3.1, 4.4, 4.6.4, 5.3, 5.4.1, 8.2 and 9.2 which call for agreement between the buyer and the seller.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the constructional details and other particulars of plain-knitted, Y-neck, jerseys, scoured, bleached, dyed or of mixture shades made from worsted yarn.

1.2 This standard does not prescribe the general appearance, lustre, feel, type of finish, and shade of jerseys (*see also 5.4*).

*Rules for rounding off numerical values (*revised*).

2. TERMINOLOGY

2.1 For the purpose of this standard, definitions as given in IS : 3596-1967* shall apply.

3. MATERIALS

3.1 Yarn — The yarn used for knitting jerseys shall be spun on worsted system from wool only or blends of wool with nylon and viscose rayon. In the case of mixture shades, the yarn shall be spun from dyed wool and nylon tops and undyed viscose rayon tops, while for solid shades, dyed wool tops shall be blended with dyed nylon and viscose rayon tops. The approximate count of yarn shall be 80 tex × 3 (Nm 12.5/3).

3.1.1 The particulars of yarn shall be as follows:

Fibre Composition		Fibre Length	Grade of Wool	Single Thread
Fibre	Percentage	mm	Tops/Fibre Fineness	Breaking Load, N (g), Min
Wool	100	80, Min	Not less than 48s	10.5 (1 050)
Wool	70	80, Min	Not less than 48s	} . 14.0 (1 400)
Crimped nylon	15	80-120	0.33 to 0.44 tex (3 to 4 denier)	
Viscose staple rayon	15	80-120	0.33 to 0.44 tex (3 to 4 denier)	

NOTE 1 — The particulars of fibre length and fineness are given for the guidance of manufacturers only and these are likely to change due to the effects of processing.

NOTE 2 — The specifications for 48s grade wool tops shall conform to IS : 5911-1977†.

NOTE 3 — The breaking load of yarn shall be determined on a test length of 500 mm using a constant rate-of-traverse type machine having a traverse of 300 ± 15 mm per minute. The breaking load of yarn when removed from the jersey may be found up to 95 percent of the specified value.

3.2 Cotton Drill Fabric — Cotton drill fabric shall be of same shade as of jerseys and shall conform to variety No. 1 of IS : 177-1970‡.

3.3 Plastic Buttons — Plastic buttons shall be of 13 mm diameter and shall conform to IS : 1461-1966§.

3.4 Cotton Sewing Thread — Cotton sewing thread shall be of 25 tex × 3 (24s/3 cotton count), of same shade as that of the jersey and shall conform to IS : 1720-1969||.

*Glossary of terms relating to hosiery.

†Fineness grades of wool tops (*first revision*).

‡Specification for cotton drills (*second revision*).

§Specification for plastic buttons (*thermosetting*) (*revised*).

||Specification for cotton sewing threads (*first revision*).

4. MANUFACTURE

4.1 In shape, the jerseys shall generally be as shown in Fig. 1. The jerseys may have seams either at the sides or at the shoulders. They shall be tailored neatly out of plain-knitted fabric. The wales shall run along the length of the jerseys.

4.2 Neck Opening — The neck shall be Y-shaped as shown in Fig. 1. The neck welt shall be made of double layer of plain-knitted fabric.

4.3 Cuffs — The cuffs shall be knitted in 1×1 rib stitches on a machine having the following particulars:

Size	No. of Needles	Diameter mm
80	80	100
Above 80	84	115

4.3.1 The cuffs shall not be too tight in texture and shall contain at least four strengthening rounds one after the other or in two steps of two rounds each at the rib edge.

4.4 Slits — If required by the buyer, jerseys shall be provided with a slit (opening) on each shoulder across the shoulder line as shown in Fig. 1. The slit shall be bound with cotton drill fabric by lock-stitches and shall be positioned at right angles to the shoulder line at a distance of 15 mm from the seam at the armhole and extending to 25 mm in front and 38 mm at the back.

4.5 Buttons — The buttons shall be provided at the positions indicated in Fig. 1. The buttons and button holes shall be reinforced on the inside of the jersey with cotton drill fabric and shall be securely attached either by machine or hand stitching. The buttons shall be wound with double thread to form a neck of approximately 2 mm.

4.6 Reinforcement

4.6.1 In case of jerseys having shoulder seams, the same shall be reinforced with cotton drill fabric.

4.6.2 The seams at the arm-pit shall be reinforced throughout by seam covering machine (*see* Fig. 1A) or with cotton drill fabric (*see* Fig. 1B).

4.6.3 The seams at the cuff sleeve joining shall be reinforced throughout by seam covering machine (*see* Fig. 1C) and with cotton drill fabric on the inside at the junction of the sleeve formation seam and cuff-sleeve joining seam (*see* Fig. 1D).

4.6.4 If required by the buyer, the sleeves shall be reinforced on the outside with cotton drill fabric as shown in Fig. 1E and 1F.

4.7 Seams and Stitches

4.7.1 The sewing details of the various portions of the jerseys shall be as follows:

<i>Portion to be Stitched</i>	<i>Type of Stitch</i>	<i>Sewing Thread</i>
All joinings	3-thread overlock	Two strands of cotton sewing thread in the needle and primary (small) looper and one strand of yarn as used for knitting the jersey in the secondary (big) looper
All hemmings	2-thread overlock	One strand of cotton sewing thread in the needle and one strand of yarn as used for knitting the jersey in the looper
Sleeve reinforcement and slits	Lock-stitches	Cotton sewing thread

4.7.2 The stitches shall be of even tension throughout and all the loose ends securely fastened off. The number of stitches shall not be less than 4 per centimetre.

4.8 Freedom from Defects — The jerseys shall be reasonably free from manufacturing and tailoring defects, such as large-mends, ladders, dropped stitches, improper reinforcement, badly sewn, misplaced button and not properly formed button holes, chemical damages and dyeing defects such as uneven dyeing and streakiness.

5. REQUIREMENTS

5.1 Dimensions and Mass — The jerseys shall conform to the requirements of Table 1 read with Fig. 1.

5.2 The jerseys shall also conform to the requirements as given in Table 2.

5.3 Fibre Composition — The fibre composition of yarn shall be as agreed to between the buyer and the seller. A tolerance of ± 5 percent shall, however, be permissible on the individual fibre contents.

TABLE 1 DIMENSIONS AND MASS OF JERSEYS

(Clause 5.1 and Fig. 1)

SIZE	WIDTH ACROSS CHEST	LENGTH OF JERSEY	WIDTH ACROSS SHOUL- DERS BELOW SLIT	SLEEVES			NECK OPENING		DISTANCE OF SLEEVE REINFOR- CEMENT FROM THE ARMPIIT	DISTANCE BETWEEN SHOUL- DER SLIT AND BUTTON	MASS PER 10 JERSEYS, Min (see NOTES 1 AND 2)	
				Length Includ- ing Cuffs	Width of Arm- hole	Length of Cuff	Width	Depth				Buttoned
	A	B	C	D	E	F	G	H	H	J	K	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm	g
80	40.0	58	36	48	20	10	15	15	28	2.5	7.5	4 480
85	42.5	64	38	53	22	11	16	16	29	4.0	8.0	5 330
90	45.0	66	41	56	23	11	17	17	31	6.0	9.5	5 610
95	47.5	68	43	58	24	11	18	18	31	7.0	10.0	5 900
100	50.0	71	46	61	25	11.5	19	19	32	8.0	11.5	6 180
105	52.5	73	48	64	26	11.5	20	20	32	9.0	12.0	6 460
TOL- ERANCE	+2.0 -1.0	+2.0	+2.0 -1.0	+2.0 -1.0	+1.0 -0.5	+0.5	+1.0	+2.0 -1.0	+1.0	+0.5	+0.5	—

METHOD OF TEST ← ————— A-2 ————— → A-3

NOTE 1 — A tolerance of minus 5 percent shall be permissible on the average mass of the individual jersey, provided the minimum collective mass is maintained as specified above.

NOTE 2 — In case of jerseys without drill reinforcement, the mass per 10 jerseys shall be reduced by 500 g.

TABLE 2 REQUIREMENTS OF JERSEYS

(Clause 5.2)

Sl. No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST
(1)	(2)	(3)	(4)
i)	Wales/dm	38 ± 2	A-4
ii)	Courses/dm	46 ± 2	A-4
iii)	Dimensional change (due to relaxation), percent	5.0, <i>Max</i>	A-5
iv)	Scouring loss, percent	4.0, <i>Max</i>	A-6
v)	pH value of aqueous extract	5.0 to 8.0	IS : 1390-1961* (cold method)
vi)	Colour fastness to :		
	a) Light (<i>see</i> Note)	5 or better	IS : 686-1957† or IS : 2454-1967‡
	b) Washing	4 or better	IS : 3361-1965§
vii)	Alkali solubility, percent	10 to 20	IS : 3429-1966

NOTE — In case of dispute, colour fastness to light shall be determined by IS : 686-1957†.

*Methods for determination of pH value of aqueous extracts of textile materials.

†Method for determination of colour fastness of textile materials to daylight.

‡Method for determination of colour fastness of textile materials to artificial light (xenon lamp).

§Method for determination of colour fastness of textile materials to washing : Test 2.

||Method for determination of solubility of wool in alkali.

5.3.1 Before conducting the chemical analysis, the fibre present in the yarn should first be identified according to IS : 667-1955* and the sample to be analysed should be free from all added and non-fibrous impurities. The percentage of wool fibres in the basic knitted fabric shall be determined according to IS : 2006-1962† and the percentage of nylon fibres in the residue according to IS : 2005-1962‡. The percentage of viscose rayon fibres shall be calculated by the following formula:

$$Z = 100 - (X + Y)$$

where

X, Y and Z are the percentages of wool, nylon and viscose rayon fibres respectively.

*Simple methods for identification of common commercial fibres.

†Method for quantitative chemical analysis of binary mixtures of protein fibres and certain other fibres.

‡Method for quantitative chemical analysis of binary mixtures of polyamide fibres and certain other fibres.

IS : 2360 - 1977

5.4 Sealed Sample — If in order to illustrate or specify the indeterminable characteristics such as general appearance, colour, feel and type of finish a sample has been agreed upon and sealed, the supply shall be in conformity with the sample in such respect.

5.4.1 Custody of the sealed sample shall be a matter of prior agreement between the buyer and the seller.

6. MARKING

6.1 A suitable cloth label, white in ground, shall be securely attached to each jersey on the inside of the neck opening (back side) on which the following details shall be woven with a fast dyed thread of contrasting shade:

- a) Name of the material;
- b) Size;
- c) Fibre composition;
- d) Manufacturer's name, initials or trade-mark, if any; and
- e) Any other information as required by the buyer.

6.1.1 Jerseys may also be marked with the Standard Mark.

NOTE — The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

7. PRESERVATION

7.1 The jerseys shall be preserved with naphthalene using a minimum quantity of 5 kg per cubic metre of volume of the bale.

8. PACKING

8.1 Jerseys of the same size and shade shall be packed together in a bale in accordance with IS : 2518-1964* or IS : 3353-1966† as the case may be.

8.2 Alternatively, the jerseys may be packed by the method given below when specifically agreed to between the buyer and the seller:

Ten jerseys of the same size and shade suitably folded shall be tied with twine or string to form a bundle. Five such bundles shall

*Code for seaworthy packaging of wool hosiery yarn and goods.

†Code for inland packing of wool hosiery yarn and goods.

be wrapped with inner layer of polyethylene film of minimum 40 microns (*see* IS : 2508-1963*) or kraft paper (*see* IS : 1397-1967†) and an outer layer of heavy cee cloth (*see* IS : 3751-1966‡) or equivalent hessian cloth to form a rectangular bale weighing approximately 35 kg. The overlaps of the inner layers shall be at least 10 cm to ensure full protection to the contents of the bale. The overlaps of the outer layer of heavy cee cloth or hessian shall be such that it can be properly and securely sewn around the bale. The bale shall be stitched with double 3-ply jute twine with not less than 12 stitches per decimetre taking care not to pierce the inner wrapping during stitching. Sufficient heavy cee cloth or hessian shall be pulled out at each corner to form 'ears' of about 15 cm in length. The bale shall be made secure by fastening with at least two bands of steel strips (or hoops) or metal wires in each direction along the length and the width of the bale.

9. SAMPLING

9.0 The sampling procedure given below shall give desired protection to the buyer and the seller provided that the lot submitted for inspection is homogeneous. To achieve this the manufacturer shall maintain a system of process control at all stages of manufacture and shall ensure that the jerseys tendered by him for inspection comply with the requirements of this standard in all respects.

NOTE — For effective process control the use of statistical quality control techniques is recommended and a helpful guidance may be obtained in this respect from IS : 397 (Part I)-1972§.

9.1 Lot — In any consignment all jerseys of the same size, colour and composition of fibres delivered to a buyer against one despatch note shall constitute a lot.

9.1.1 The conformity of the lot to the requirements of this specification shall be determined on the basis of the tests carried out on the samples selected from it.

9.2 Unless otherwise agreed to between the buyer and the seller, the number of jerseys, depending upon the size of the lot, shall be selected at random in accordance with col 2 of Table 3.

*Specification for low density polyethylene films.

†Specification for kraft paper (*first revision*).

‡Specification for heavy cee cloth.

§Method for statistical quality control during production: Part I Control charts for variables (*first revision*).

TABLE 3 NUMBER OF JERSEYS TO BE SELECTED FROM A LOT AND PERMISSIBLE NUMBER OF NON-CONFORMING JERSEYS

(Clauses 9.2 and 9.3)

NUMBER OF JERSEYS IN THE LOT	NON-DESTRUCTIVE TESTING		DESTRUCTIVE TESTING	
	Number of Jerseys to be Selected	Permissible Number of Non-conforming Jerseys	Number of Jerseys to be Selected	Permissible Number of Non-conforming Jerseys
(1)	(2)	(3)	(4)	(5)
Up to 300	10	1	2	0
301 „ 500	20	1	3	0
501 „ 1 000	30	2	5	0
1 001 „ 3 000	50	3	8	0
3 001 and above	80	5	13	1

9.3 The sample size and criteria for conformity for various characteristics shall be as follows:

<i>Characteristic</i>	<i>Number of Tests</i>	<i>Criteria for Conformity</i>
Freedom from defects, dimensions and number of wales and courses	All the jerseys selected according to col 2 of Table 3	Non-conforming jerseys not to exceed the corresponding number given in col 3 of Table 3
Mass	do	Each observed value to satisfy the specified requirement
Specification for wool tops, breaking load of knitting yarn, dimensional change, scouring loss, pH value, colour fastness to washing, alkali solubility and fibre composition	All the jerseys selected according to col 4 of Table 3	Number of non-conforming jerseys not to exceed the corresponding number given in col 5 of Table 3
Colour fastness to light	One in case of lot size of 500 jerseys and two above that	Each jersey to satisfy the specified requirement

APPENDIX A

(Tables 1 and 2)

METHODS OF TEST

A-1. CONDITIONING OF TEST SPECIMENS AND ATMOSPHERIC CONDITIONS FOR TESTING

A-1.1 The test specimens shall preferably be conditioned for testing and tested in the standard atmosphere as given in IS : 6359 - 1971*.

A-2. DIMENSIONS

A-2.1 Take a jersey constituting the test sample (*see 9.3*). Lay it flat on a horizontal surface. Remove all creases and wrinkles without distorting it. Measure correct to the nearest millimetre the dimensions given in Table 1.

A-3. MASS

A-3.1 Take a set of 10 jerseys constituting the test sample (*see 9.3*). Condition them to moisture equilibrium for 24 hours (*see A-1.1*) and weigh to an accuracy of 10 g. Also determine the mass of individual jerseys.

A-4. WALES AND COURSES

A-4.1 Take a jersey constituting the test sample (*see 9.3*). Lay it flat on a horizontal surface. Remove all creases and wrinkles without distorting it. Count with the help of a pick glass or magnifying glass, the number of wales and courses per decimetre of the fabric at five different places and calculate the average.

A-5. DIMENSIONAL CHANGE (DUE TO RELAXATION)

A-5.1 Marking of Test Specimens — Take one of the pieces from the test sample (*see 9.3*). Mark centrally on it by means of indelible ink or a fast dyed cotton sewing thread an area 15×15 cm with two of its sides running in the direction of wales and the other two in the direction of courses. Spread this test specimen on a flat smooth surface, carefully removing by hand all creases and wrinkles. Within this area, mark six pairs of marks, three pairs each in the wales and courses direction in such a way that the distance between each pair of marks is the same.

*Method for conditioning of textiles.

A-5.2 Procedure

A-5.2.1 Place test specimen on a glass plate and carefully remove by hand all creases and wrinkles without stretching the test specimen and place the other glass plate on the test specimen. Measure correct to the nearest millimetre the distance between each pair of marks separately.

A-5.2.2 Lay the test specimen flat in a water-tight tray of suitable size and of depth 10 cm, *Min.* Soak it under a head of 25 mm of water containing 0.5 percent suitable wetting agent at room temperature (30 to 35°C) for 2 hours. Drain out the water and remove the test specimen carefully so that it is not stretched and lay it flat on a smooth surface. Remove the excess of water by absorbent material and dry it at room temperature.

NOTE — Removal of excess water by wringing the test specimen is not permitted.

A-5.2.3 After drying, condition the test specimen to moisture equilibrium at the room temperature. Place it on the glass plate, carefully remove all wrinkles and creases and place the other glass plate on the test specimen. Measure correct to the nearest millimetre the distance between each pair of marks separately.

A-5.3 Calculation

A-5.3.1 Calculate separately the percentage of dimensional changes in the direction of wales and courses by the following formula:

$$Sr = \frac{100 \times (a - b)}{a}$$

where

Sr = dimensional change (due to relaxation), percent;

a = the distance between a pair of marks (along the wales or courses as the case may be) before soaking; and

b = the distance between the same pair of marks after soaking.

A-5.3.2 Calculate separately the dimensional change (due to relaxation) of all the three lines in the direction of wales and courses and calculate average dimensional change (due to relaxation) in each direction.

A-6. SCOURING LOSS

A-6.1 Test Specimen — Cut from each sample (*see* 9.3), about 10 g of the fabric. This shall constitute the test specimen.

A-6.2 Procedure

A-6.2.1 Dry the test specimen to constant mass in the drying oven at $105 \pm 3^\circ\text{C}$ temperature and determine its mass accurately.

NOTE — Constant mass shall be deemed to have been reached if the difference between the two successive weighings at an interval of 20 minutes is less than 0.05 percent.

A-6.2.2 Extract the above specimen with a mixture of benzene and methyl alcohol in the proportion of 3 : 2 in a Soxhlet apparatus for 4 hours at the rate of 5 extractions per hour, by placing the specimen in a thimble and covering it with cotton wool previously extracted with the above stated mixture of benzene and methyl alcohol in the proportion of 3 : 2. The solvent shall then be distilled off from the extract. Dry the residue to a constant mass (*see Note under A-6.2.1*) at $105 \pm 3^\circ\text{C}$ and determine the mass accurately.

A-6.3 Calculations

A-6.3.1 Calculate the scouring loss by the following formula:

$$\text{Scouring loss, percent} = \frac{100 a}{b}$$

where

a = mass of the dry residue (*see A-6.2.2*), and

b = mass of the test specimen (*see A-6.2.1*).

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'Sahajanand House' 3rd Floor, Bhaktinagar Circle, 80 Feet Road, RAJKOT 360002 36 85 86

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